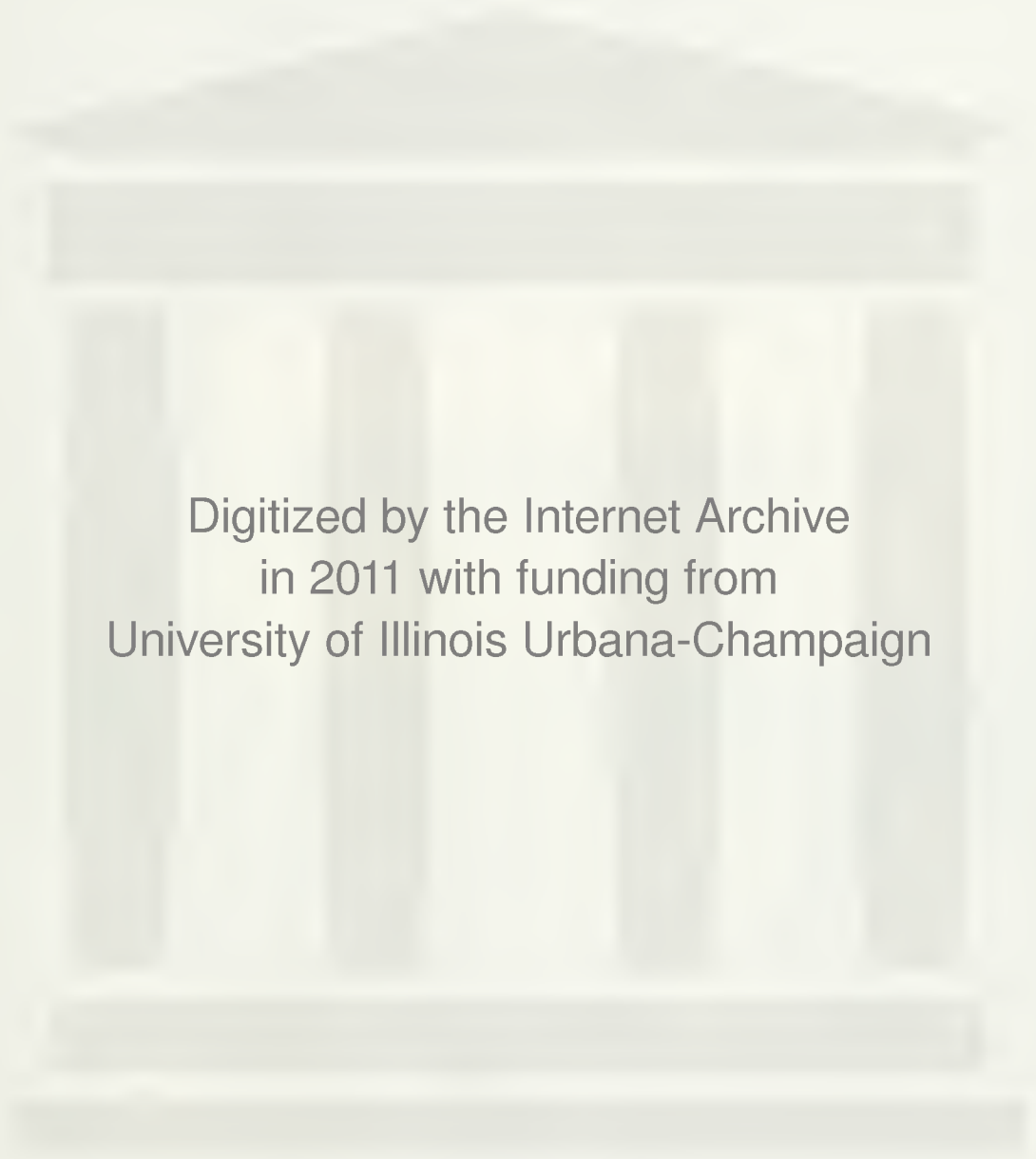

Faculty Working Papers

DIFFERENTIAL CHANGES IN EXTERNAL MARKET LIQUIDITY

Frank K. Reilly and James A. Gentry

#426

College of Commerce and Business Administration
University of Illinois at Urbana-Champaign

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ABSTRACT

DIFFERENTIAL CHANGES IN EXTERNAL

MARKET LIQUIDITY

External market liquidity refers to the ability to buy or sell an asset quickly with little price change. Using a market liquidity measure developed by Amivest Corporation, there is an analysis of aggregate market liquidity during the period 1969-1975. Subsequently, using two samples of 24 larger firms and 24 smaller firms, there is a comparison of the levels of liquidity and a comparison of changes in liquidity for the two samples during this period.

DIFFERENTIAL CHANGES IN EXTERNAL MARKET LIQUIDITY*

Frank K. Reilly
James A. Gentry**

INTRODUCTION

External market liquidity refers to the ability to buy or sell an asset quickly with little price change assuming no new information. This characteristic is important to all investors because the lack of it can increase the cost of an asset to the purchaser or decrease the revenue to the seller of an asset. This attribute has become important to portfolio managers of large institutions concerned with the ability to buy or sell blocks of stock [4, 6, 7]. Because institutional investors are the dominant force in the secondary market, market liquidity becomes important for the financial manager considering new external equity capital. If a company's stock does not enjoy a liquid secondary market, it is unlikely the company can sell a new primary issue. In addition, a poor secondary market can add to the risk of the stock and increase the firm's required rate of return on equity.

The purpose of this paper is threefold. The first is to discuss a measure of external market liquidity that can be used to examine changes in liquidity for the aggregate stock market and for individual stocks. The second purpose is to examine this liquidity measure for the aggregate market

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over time and demonstrate how external market liquidity has varied. Finally, there is an anlysis of market liquidity for two samples of individual firms. The samples include 24 larger firms from the top of the Fortune 1000 list and a sample of 24 smaller firms from the bottom of the Fortune 1000 list. The liquidity measure for the two different samples is examined over time in order to provide answers to two questions of concern to portfolio managers and corporate financial managers. First, is there a significant difference in the average level of market liquidity for large and small firms? The general consensus is that larger firms enjoy a higher level of market liquidity. If so, it should be of interest to know how much higher. The second question is concerned with changes in the level of market liquidity for the two samples during the period 1969-1975. Some observors have speculated that since 1969 there has been a differential change in market liquidity for large versus small firms because of the emergence of a tiered market.

AGGREGATE STOCK MARKET LIQUIDITY

A Liquidity Measure

As noted, market liquidity is the ability to buy or sell an asset quickly with little price change. Given this definition, the important attributes that require measurement are the *time* involved in a trade and the *price change*. Generally, information regarding the time required to complete a trade is not available. Fortunately, the time variable is probably not a crucial requirement because most trades not involving large "blocks" of stock (10,000 shares or more) are completed rapidly--in less than an hour, and in most instances in less than 15 minutes. Therefore, the time dimension is relatively constant. Hence the *price change* becomes

the variable of importance, but it is not simply price change. Not all trades are of equal size in terms of the number of shares involved and/or the value of the trade. Clearly one should relate the price change to the amount of trading. Such a measure has been developed by the Amivest Corporation, a New York research firm. The specific measure is derived daily for all stocks on the NYSE and the ASE and an unweighted average for all stocks is computed. The average of the daily values for a month is used as the monthly figure. The computation for each stock is as follows [2]:

$$\text{Amivest \$ Index} = \frac{\text{Dollar Volume of Trading}}{\text{Percent Price Change Without Sign}}$$

This measure indicates the value of trading for every 1 percent price change. The larger the value of the index, the more trading that is possible without a major price change. Such a series for the aggregate market was not available prior to 1973 so it was necessary to derive a proxy. Such a proxy series was developed as part of another study for the period 1964-1975 [9]. The proxy series was computed monthly as:

$$\text{Amivest \$ Index} = \frac{\text{Dollar Value of Trading on the NYSE}}{\text{Sum of Daily Percent Price Changes w/o Sign}}$$

In addition, because some portfolio managers might conceive of liquidity in terms of how many *shares* can be traded, a share index was computed that indicates the number of shares traded per 1 percent change in price. It was computed as follows:

$$\text{Amivest Share Index} = \frac{\text{Total Reported Shares Traded on NYSE}}{\text{Sum of Daily Percent Price Changes w/o Sign}}$$

Advest Index = $\frac{\text{Dollar Volume of Trading}}{\text{Squared Price Change} \cdot \text{Number Shares Sign}}$

This measure implies the value of "depth" in the market: a particular price change is more significant. The larger the value of the index, the more liquidity that is possible without a major price change. Such a measure might be very appropriate market for 1973 as it was not available prior to 1973 so it was necessarily left out of a proxy. Such a proxy series was developed as part of another study for the period 1964-1975 [9]. The proxy series was computed monthly as:

Advest 2 Index = $\frac{\text{Dollar Value of Trading on the NYSE}}{\text{Max of Daily Percent Price Change Per Share}}$

In addition, because some investors might be more interested in liquidity in terms of how much stock can be traded without significantly affecting the market price of the issue, Advest also computed:

Advest Share Index = $\frac{\text{Total Number Shares Traded on NYSE}}{\text{Sum of Daily Percent Price Changes Per Share Sign}}$

These measures can also be used to measure the liquidity for individual securities over time. In fact, this is the major use made of the liquidity measure by the originators [2]. In a subsequent section these liquidity measures are used to examine the level of liquidity and changes in liquidity for a sample of larger firms and a sample of smaller firms.

Aggregate Liquidity Over Time

Exhibits 1 and 2 contain a monthly time series plot of the two Amivest liquidity measures for the period January, 1969-December, 1975. Exhibit 1 contains the dollar index and indicates *significant variation over time* from a low of .19 ($190,000) during the latter half of 1974, to a high of almost 2.5 ($2,500,000) during the first half of 1972. Not only is there a wide range of values, but there was substantial variability over time on a month-to-month basis. The point is, the plot indicates that *external market liquidity for the total stock market is clearly not constant over time.* Based upon a casual analysis it appears that a major factor influencing market liquidity is the general market environment. Specifically, liquidity was low during the 1969-70 bear market and also declined steadily during 1973-74 when stock prices fell by over 40 percent. In fact, the series hit its trough during 1974. In contrast, market liquidity reached its high point during the bull market of 1972, and increased from its low point during the rising market of 1975.

The results for the Amivest Share Index (Exhibit 2) are quite similar. In this case the range was from about .08 (80,000 shares) in 1970 and 1974, to a high of over .60 (600,000 shares) during 1972. This similarity in wide ranges is not surprising since the monthly values for the two liquidity

...ease measures can also be ... to measure the liquidity of individual ...securities over time. In fact, this is the major ... of the liquidity measure by the ord-inaires [8]. In addition, such ... these liquidity measures are used to examine ch...ges in ... liquidity for a sample of insurance firms that ... smaller firms.

Aggregate Liquidity Over Time

Exhibits 1 and 2 contain a summary ... series plot of the two Amivest liquidity measures for the period ... Exhibit 1 contains the decline ... and Exhibit 2 ... Dec. 31, 19 ($100,000) during ... 1974. ... a level of ... 1.5 (2,500 ... during the first half of 1972. ... only to ... a ... value of ... but there was ... ...

EXHIBIT 1

TIME SERIES PLOT OF MONTHLY AMIVEST DOLLAR LIQUIDITY
INDEX FOR NEW YORK STOCK EXCHANGE

January, 1969 - December, 1975

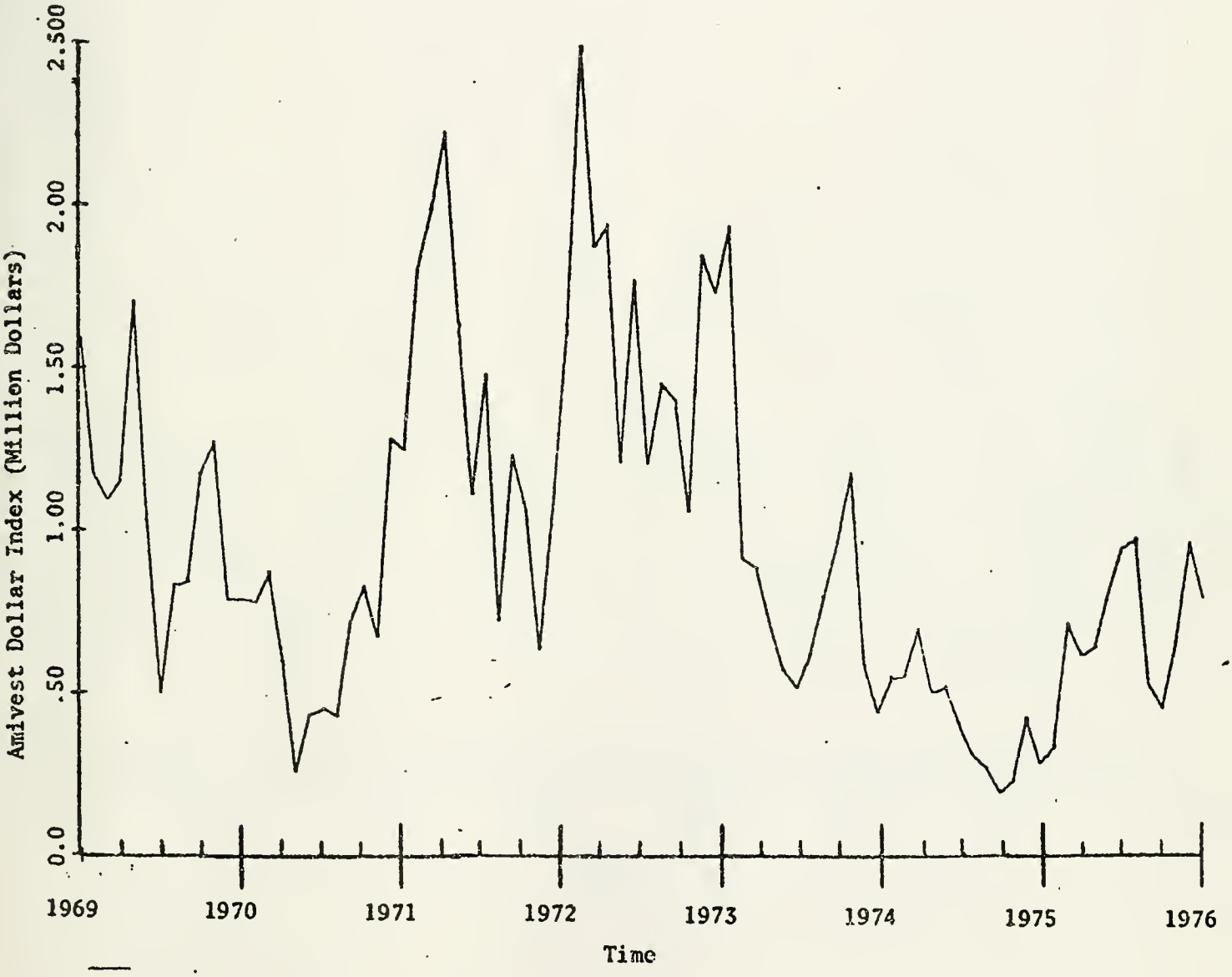
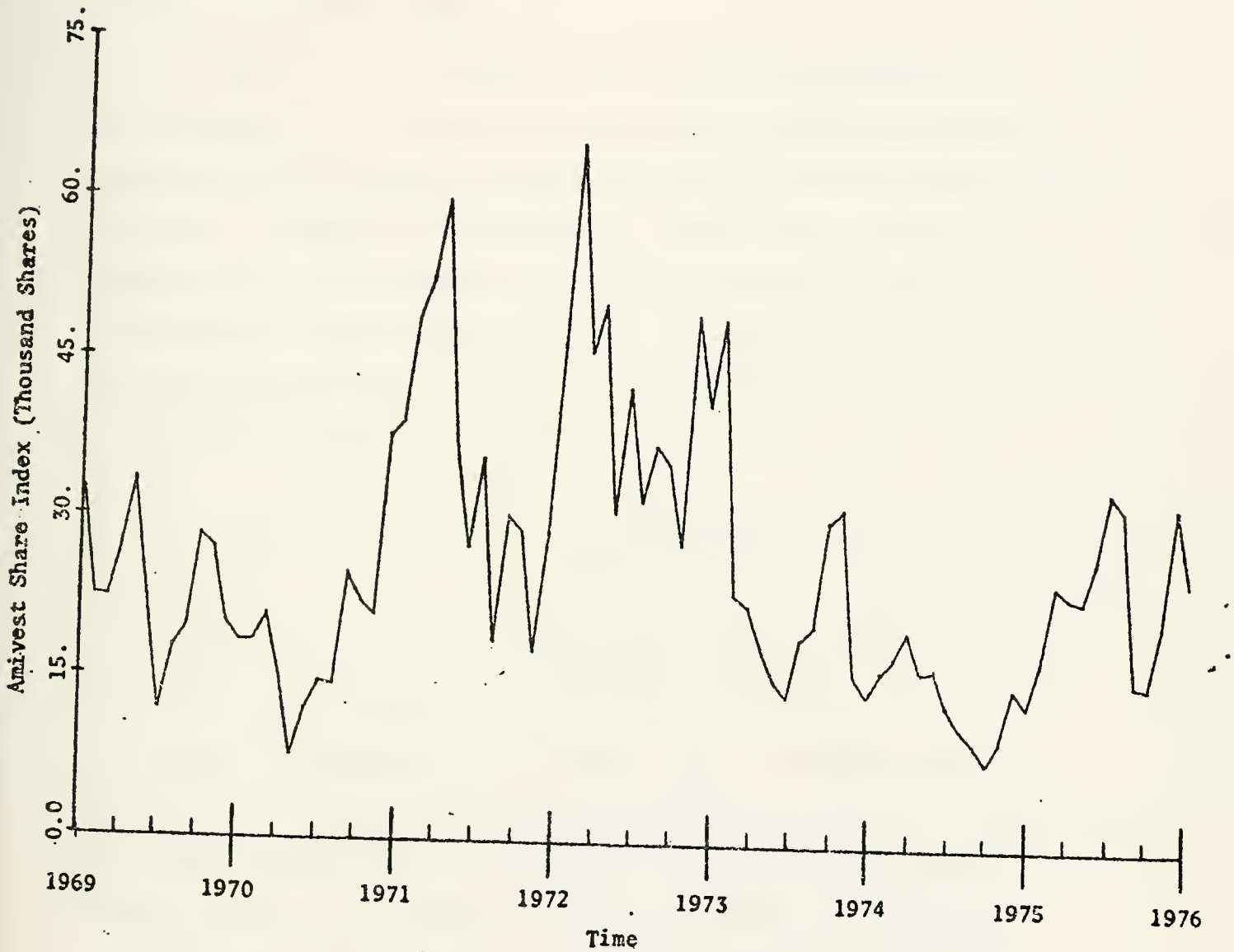
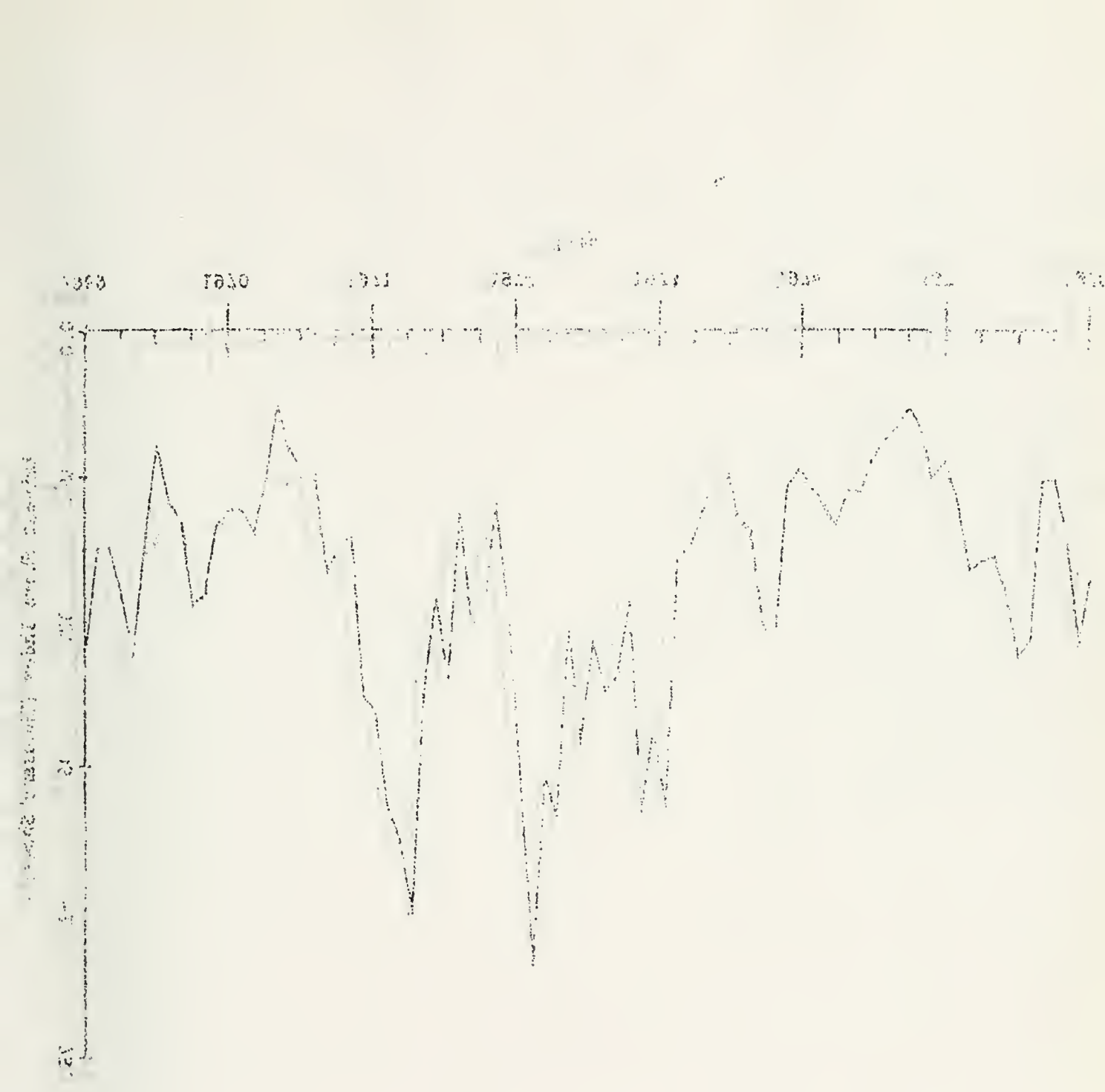


EXHIBIT 2

TIME SERIES PLOT OF MONTHLY AMIVEST SHARE LIQUIDITY INDEX FOR THE NEW YORK STOCK EXCHANGE

January, 1969 - December, 1975





series are correlated about .90.

In summary, these graphs indicate that aggregate market liquidity *varies widely over time* and *is quite volatile on a month-to-month basis.*

INDIVIDUAL STOCK LIQUIDITY

Measures for Individual Stocks

As noted, the Amivest measures can be derived for individual stocks for a period of time. Obviously the computations are much more extensive because total dollar trading and share trading is not available for individual stocks. Therefore it is necessary to determine daily percent price changes for each stock relative to the volume of trading for each day. The share volume is straightforward; the dollar volume was computed as the number of shares traded times the mean of the high and low price for the day. A monthly figure is computed as follows:

$$\text{Amivest Share Index} = \sum_{i=1}^{N} \frac{\text{Shares Traded Day } i}{\text{Percent Price Change w/o Sign}} \quad N$$

$$\text{Amivest Dollar Index} = \sum_{i=1}^{N} \frac{\text{Shares Traded x (Hi+Lo/2)}}{\text{Percent Price Change w/o Sign}} \quad N$$

where N = the number of trading days in the month.

Because of the extensive computations required for each stock, it is not feasible to derive the index for each stock for every month during the time period. Because we wanted to analyze these series for individual stocks over time, it was decided to compute the measure for a specified month each year. Specifically, it was decided to compute the measure during the month of May for each year 1969-1975. The choice of May was

Measuring Individual Needs

arbitrary on the basis that stock prices should not be affected by year-end factors that occur during November to February or influenced by the "summer" rally factors.

An analysis of the liquidity indexes indicated that the liquidity values vary substantially among stocks, and also vary for individual stocks over time. One obvious reason for expecting the liquidity values for individual stocks to vary over time is that the aggregate market liquidity varies substantially. Therefore, it was decided to "normalize" the monthly liquidity value for individual stocks by the aggregate market value for that month. The result is a *relative* measure of liquidity over time as follows:

$$\text{Relative Amivest Dollar Index} = \frac{\text{Co. Amivest Dollar Index (May)}}{\text{Market Amivest Dollar Index (May)}}$$

As an example, the unadjusted dollar index for American Can during May, 1969, was $958,497 and the comparable market index was $1,706,557. Therefore, the *relative* dollar Amivest index for American Can was .562, indicating that American Can's dollar liquidity during May, 1969, was about 56 percent as large as the average stock on the NYSE. A comparable calculation with American Can's share index and the market share index shows a relative share value of .51 indicating that American Can's share liquidity was about one-half as large as the share liquidity for the average stock on the NYSE.

The relative liquidity measures for individual stocks are employed in the next section where there is a comparison of the market liquidity for a sample of larger firms to the liquidity for a sample of smaller firms.

$$\frac{\text{Vol. Myvest Dollar Index (\$)}}{\text{[illegible]}}$$

LARGER FIRMS VERSUS SMALLER FIRMS

Sample Firms

The total sample was derived as part of a larger study that considered external and internal liquidity using quarterly financial statements. Therefore, the larger firm sample includes 24 firms that provided quarterly financial statements (balance sheet and income statements) for the seven years 1969-1975. The companies also had to be on Compustat and on the University of Chicago stock price tapes (CRSP tapes). Even with these constraints, the list includes the three largest industrial firms on the Fortune 1975 top 1000 industrial list (Exxon, General Motors, and Ford). There were only five companies that would not be in the top 100 (United Airlines was second on the transportation list but would have been about number 75 on the industrial list; Jewel Companies were 11th on the retailing list and would have been 80 on the industrial list). The smallest company in this sample was Amsted with a rank of 360. The sample of smaller firms was randomly selected from the 50 smallest firms on the Fortune 1000 list that likewise had data available on Compustat and CRSP.

Clearly the sample of larger firms is generally the largest available in our economy since they are near the top of the Fortune list. In contrast, the sample of "smaller" firms are not small in absolute terms since they are still part of the Fortune list, but are definitely smaller than the large group. As an example, the 1,000th company on the 1975 Fortune list was Seagrave. This company had sales of over $91 million and assets of over $57 million. In absolute terms this firm is not small, but it is small compared to Exxon (number 1 in 1975) that had sales of $42 billion

and assets of $31 billion. The point is, the smaller company sample is small compared to the larger firms, but still much larger than a number of other public firms which number close to 10,000. Therefore, they are smaller than the large firms, but larger than about 9,000 other firms.

Overall Individual Stock Results

An examination of the liquidity values for the two samples in Exhibits 3 and 4 indicates three relevant observations. First, the relative values vary widely between individual firms within a group (larger firms or smaller firms) even though the firms in a sample are quite comparable in terms of company size as shown in the Fortune list. As an example, during 1969 the relative dollar indexes for the large firm sample ranged from .07 for Amsted to 7.14 for Atlantic Richfield. If one ignores Amsted as being too small, the low value becomes .35 and the high to low ratio is over 20 times.

The second observation is that the liquidity values for individual stocks vary substantially *over time*. This is impressive considering that these are *relative* measures and as such should not be affected by market changes. As an example, the Eastman Kodak relative dollar index ranged from 1.94 in 1969 to 30.92 in 1973--a factor of over 15. Finally, it is apparent that the relative dollar indexes and relative share indexes for individual companies during specific years are generally quite similar. Put another way, the alternative liquidity measures for individual stocks clearly move together over time.

Comparisons

The purpose of the subsequent comparisons is twofold. The first intent

EXHIBIT 3

RELATIVE MEASURES OF EXTERNAL MARKET LIQUIDITY
FOR 24 LARGE FIRMS (DOLLAR AND SHARES)

COMPANY	1969		1970		1971		1972		1973		1974		1975	
	$	Shrs	$	Shrs	$	Shrs	$	Shrs	$	Shrs	$	Shrs	$	Shrs
American Can	.56	.51	1.31	1.14	.64	.70	.71	.84	1.50	1.46	.44	.43	.64	.53
American Hospital & Supply Co.	.37	.53	1.53	1.50	.68	.91	1.09	.95	2.61	2.32	1.25	1.07	.82	.67
Amsted Industries	.07	.08	.29	.29	.09	.10	.10	.10	.15	.13	.29	.22	.92	.44
Atlantic Richfield Co.	7.14	2.87	9.36	4.30	2.79	1.60	9.15	5.60	7.92	3.51	8.27	2.47	8.13	2.62
Caterpillar Tractor	1.12	1.06	2.09	1.86	.53	.45	1.54	1.11	5.38	3.19	5.21	2.65	6.98	3.14
Chrysler Corp.	1.10	1.08	4.18	5.89	1.43	2.09	1.57	1.79	4.46	5.38	.90	1.05	.81	1.22
John Deere	.87	.95	2.16	1.91	.92	.80	1.06	.66	2.13	1.91	1.58	1.31	3.45	2.28
Eastman Kodak	1.94	1.27	12.50	6.21	5.56	3.06	7.24	2.37	20.92	8.58	18.33	5.37	11.59	3.22
Exxon Corp.	4.46	2.74	16.34	9.96	6.19	3.50	6.62	3.59	32.50	12.46	10.45	4.15	7.71	2.77
Ford Motor Co.	2.14	2.12	7.79	6.06	1.09	1.34	3.89	2.23	9.49	5.78	6.17	3.70	3.91	3.10
General Motors Corp.	5.20	5.23	15.46	7.84	6.41	3.31	9.47	4.73	20.53	10.74	10.24	6.41	7.38	4.60
Georgia Pacific	1.28	.65	5.61	4.14	1.71	1.42	.85	.63	1.70	1.68	2.54	1.72	1.71	1.02
International Harvester	.58	.90	1.72	2.20	.53	.80	.65	.79	1.38	1.75	.64	.74	1.35	1.35
International Paper	1.51	1.71	2.13	2.25	1.11	1.22	1.32	1.26	2.73	2.66	2.88	1.92	2.37	1.37
Jewel Companies	.35	.34	1.23	.98	.42	.32	.47	.33	.36	.31	.46	.33	.34	.31
Monsanto	1.14	1.17	2.98	2.74	1.64	1.57	1.58	1.14	3.12	2.18	13.02	6.11	6.27	2.78
Motorola	.74	.31	3.26	1.31	1.58	.85	2.21	.82	3.08	1.11	3.57	1.87	3.88	2.25
Proctor and Gamble	1.48	.83	3.87	1.53	2.33	1.69	2.17	.91	8.38	3.06	7.40	2.35	5.61	1.75
Quaker Oats	.35	.30	.70	.58	.51	.53	.41	.27	.58	.52	.36	.42	.33	.54
A. E. Staley	.23	.26	.53	.41	.07	.07	.11	.11	.21	.19	.17	.13	.40	.17
Standard Oil Co. (CAL)	2.90	2.04	10.28	7.13	1.83	1.33	2.59	1.63	5.51	2.58	3.83	2.98	1.74	1.88
Standard Oil Co. (IND)	2.78	2.09	4.22	2.69	1.55	1.10	2.10	1.27	15.80	6.53	6.46	2.39	2.87	1.82
Union Oil Co.	1.91	1.67	2.51	2.35	.83	.75	1.01	.94	1.90	1.60	1.28	.93	1.79	1.24
United Airlines	.71	.95	1.90	1.79	.57	.67	1.02	.81	.73	1.18	1.36	1.49	.81	1.05

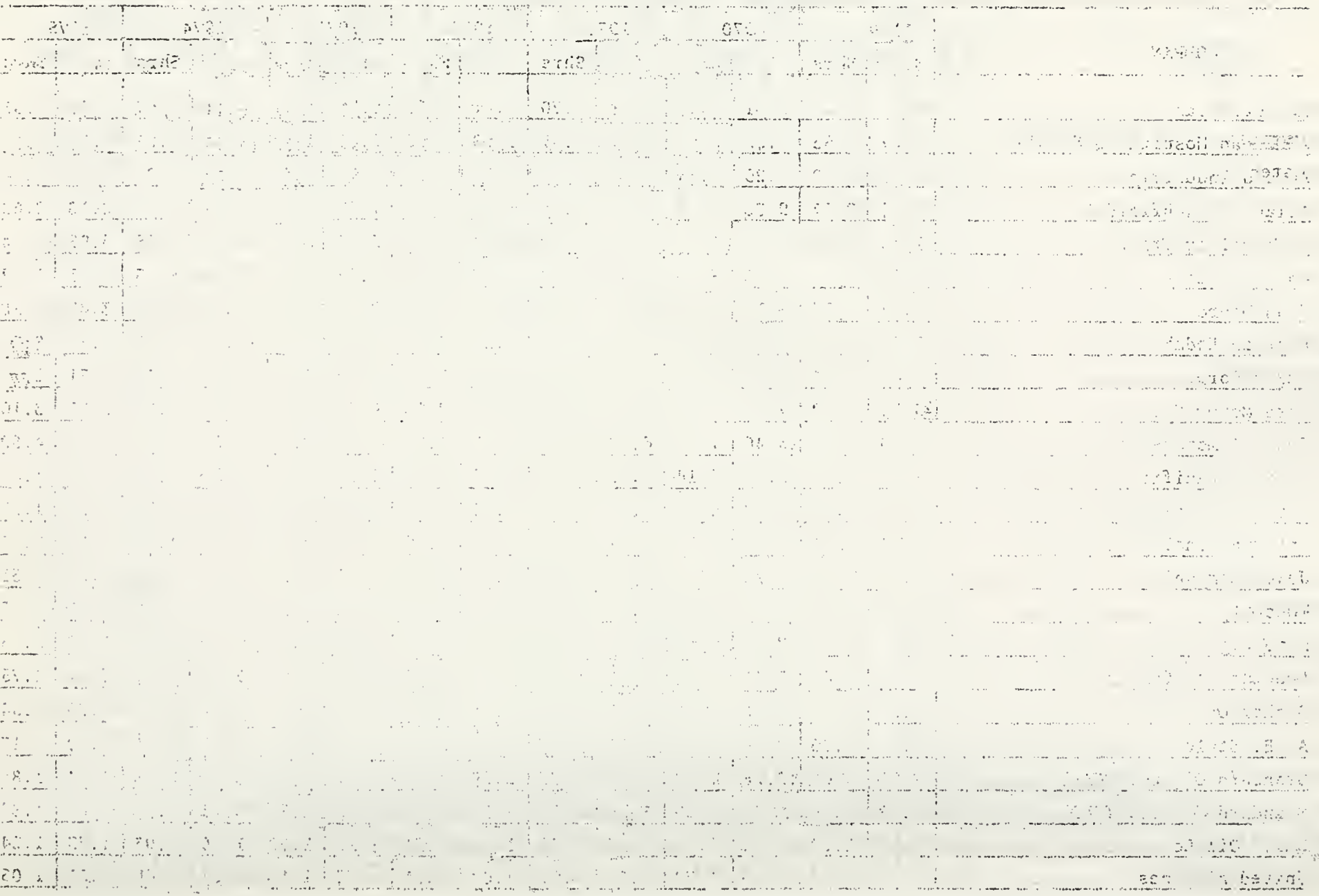


EXHIBIT 4

RELATIVE MEASURES OF EXTERNAL MARKET LIQUIDITY
FOR 24 SMALLER COMPANIES (DOLLAR & SHARES)

COMPANY	1969		1970		1971		1972		1973		1974		1975	
	$	Shrs	$	Shrs	$	Shrs	$	Shrs	$	Shrs	$	Shrs	$	Shrs
American Shipbuilding	.02	.04	.05	.09	.03	.04	.05	.05	.05	.10	.07	.18	.03	.07
Bates Mfg. Co.	.01	.02	.02	.06	.01	.04	.01	.03	.01	.03	.01	.03	.24	.29
Belding Hemingway	.02	.04	.05	.08	.03	.04	.04	.08	.02	.05	.04	.08	.01	.02
Carter Wallace	.07	.18	.27	.50	.06	.17	.18	.30	.06	.14	.06	.13	.07	.15
Cleveland Cliffs	.02	.02	.09	.07	.08	.05	.08	.05	.18	.11	.27	.11	.54	.16
Cox Broadcasting	.09	.09	.07	.13	.07	.11	.33	.32	.11	.12	.07	.08	.08	.10
Dentsply Inc.	.13	.12	.25	.20	.44	.44	.25	.21	.11	.13	.19	.19	.32	.27
Dr. Pepper Co.	.07	.06	.24	.46	.09	.14	.29	.23	.52	.80	.27	.47	.29	.57
Fansteel Inc.	.04	.09	.06	.16	.01	.04	.08	.18	.03	.07	.06	.09	.04	.06
Hayes-Albion	.01	.02	.04	.08	.02	.04	.03	.05	.02	.05	.02	.03	.02	.03
Holly Sugar Corp.	.01	.02	.04	.08	.03	.09	.01	.03	.03	.05	.12	.20	.15	.15
Keller Industrials Inc.	.04	.07	.09	.12	.03	.04	.07	.11	.06	.12	.05	.07	.01	.03
Kroehler Manufacturing Co.	.02	.02	.05	.10	.02	.02	.03	.03	.02	.04	.03	.04	.01	.01
Lehigh Valley	.08	.31	.11	.42	.03	.13	.06	.19	.10	.23	.14	.34	.09	.22
Lessona Corp.	.14	.14	.06	.13	.04	.05	.02	.03	.09	.10	.09	.07	.07	.07
MacAndrews-Forbe	.03	.07	.07	.14	.03	.05	.02	.04	.02	.06	.03	.04	.02	.03
Marquette Cement	.03	.08	.08	.17	.05	.12	.02	.07	.06	.16	.05	.09	.03	.07
Munsingwear Inc.	.04	.06	.08	.09	.03	.03	.03	.04	.05	.06	.06	.05	.05	.05
Pitt Forgings	.01	.04	.07	.14	.01	.03	.01	.03	.03	.06	.04	.07	.01	.02
Skil Corp.	.02	.02	.05	.06	.03	.05	.09	.10	.10	.11	.02	.03	.01	.02
Stanray Corp.	.07	.13	.10	.18	.04	.08	.05	.09	.03	.09	.10	.12	.06	.08
Storer Broadcasting	.14	.17	.24	.31	.09	.12	.37	.35	.25	.43	.12	.14	.12	.15
Texas Industries Inc.	.05	.08	.15	.17	.03	.04	.08	.10	.09	.11	.06	.06	.04	.05
Thomas and Betts	.05	.05	.24	.21	.17	.15	.12	.07	.48	.20	.45	.33	.14	.10

is to determine if there are *any differences* in the level of market liquidity for small versus large firms. The second purpose is to determine if there has been any difference in the *trends* of liquidity over time. Specifically, have the liquidity values for large and smaller firms moved in parallel over time or has there been a change in the performance of one group relative to the other?

Regarding the differential level of liquidity it was expected that on average the large firms would have a higher level of liquidity than the smaller firms because they have more shares outstanding, they are better-known, and generally experience more trading activity. The expectation for the analysis of differential trends is related to the notion of a tiered market. It has been observed during the past ten years that because of the growth of institutions and the increase in their trading turnover, they have come to dominate trading in the secondary equity market [1, 3]. Further, institutions prefer large firms because of their liquidity [8]. Hence, a "tiered market" has evolved with large firms in the upper tier and the great bulk of smaller firms comprising the lower tier [5, 10]. The result of the tiered market in terms of liquidity is that the rich get richer and the poor get poorer. Specifically, one would expect in a tiered market that the large firms that are of interest to the institutions that dominate trading would become *more* liquid, while the smaller firms in the lower tier would either experience *no change* in liquidity or might even show a *decline* in their market liquidity over time. Therefore, it was hypothesized that there would be a divergence in the liquidity for the two groups over time.

Differences in the Level of Liquidity

The analysis considered the average liquidity for the two samples of stocks over time. The results reported in Exhibit 5 clearly support the belief that *there is a major difference in the relative liquidity for the large firms compared to the smaller firms*. In fact, the differences were substantially larger than expected. In terms of the relative dollar liquidity measures, the large firms are over 30 times more liquid than the smaller firms. In terms of the relative share liquidity measures the large firms are over 15 times more liquid.

The difference in comparison for the two measures is interesting. This difference occurs because the dollar index for the larger firms is generally twice as large as the share index for these firms. In contrast, for the smaller firms the share index is larger than the dollar index. This seeming paradox can be explained by the differential price of the shares for the two sets of firms. The average share price for the large firms is in excess of $50, while the average share price for the smaller firms is about $25. Therefore, the large firms have greater share liquidity, i.e., they can sell about 15 times more shares for a given percent change in price than the smaller firms. Then, considering the price of the s shares for the larger firms is about twice the share price of the small firms, the dollar values indicate an investor in a large firm can buy or sell 30 times as many dollars of stock for a given percent change in price as an investor in a smaller firm.

Because of the possible price bias connected with the share index, most observers would probably agree that the dollar index is preferable for comparing two groups of stocks. The point is, *irrespective of which*

EXHIBIT 5

AVERAGE RELATIVE LIQUIDITY VALUES
FOR LARGE AND SMALLER FIRM SAMPLES

	Dollar Index			Share Index		
	Large	Small	Ratio L/S	Large	Small	Ratio L/S
1969	1.705	.050	34.1	1.236	.081	15.3
1970	4.715	.107	44.1	3.256	.173	18.8
1971	1.709	.061	28.0	1.259	.089	14.1
1972	2.455	.097	25.3	1.454	.116	12.5
1973	6.796	.105	64.7	3.359	.144	23.3
1974	4.463	.101	44.2	2.175	.127	17.1
1975	3.409	.103	33.1	1.756	.116	15.1

liquidity series is used, the results support the expectation that the external market liquidity for larger firms is *significantly greater* than the market liquidity for smaller firms. Relating these results to the selection of the sample, it should be noted that the results would probably be more divergent if the larger firm sample had been confined to the top 50 firms. As it is, the sample only contains three of the top 13 stocks in terms of liquidity (General Motors, Eastman Kodak, and Exxon); but it is missing such notable institutional favorites as IBM (the most liquid stock) and AT&T.

Changes in Liquidity Over Time

The data in Exhibit 5 indicate what happened to the average liquidity for the two groups of individual sample firms over time. It was hypothesized that the relative liquidity for the larger firms would probably increase over time because of the increased trading by institutions and their desire to acquire larger firms. In contrast, it was expected that the liquidity for smaller firms would generally remain constant or possibly decline because the dominant institutions would generally not have an interest in these firms. Therefore, one would expect that a ratio of the average liquidity values would increase over time assuming the ratio was the relative liquidity value for the large firms divided by the average relative liquidity value for the smaller firms.

Averages Over Time

The figures in Exhibit 5 indicate that the average liquidity values for both samples and measures generally *increased over time.* Specifically,

for both small and medium sized companies. Specifically,

The company's liquidity ratios for the average liquidity values

were the industry liquidity value for the same three years. Stated by the average

re liquidity ratios for the smaller firms.

Average Cash Flow

the average flow was positive, indicating the ratio

increase in value [illegible] the expected that a positive

cycling because the cash conversion cycle will not have an

the liquidity for service firms would necessarily remain constant or possibly

increase over all periods. The investment in working capital [illegible] and

for the service industry for the five year time period. It was hypothesized

that the average liquidity ratios for the service firms would be the same

injured itself in the [illegible] Sports Medicine Clinic. If the [illegible]

be more diversified the owner may need [illegible] to use

of funds. As it is [illegible] only receivables where [illegible]

profession in terms of liquidity [illegible] Sports Medicine Clinic and Baxendale

but it is missing one notable qualification: as the [illegible] most

Changes in Liquidity Over Time

The data in Exhibit 2 indicate [illegible] for the average liquidity

for the two [illegible] industries remained fairly [illegible]. It was hypothesized

that the liquidity for service firms would increase [illegible] probably

increase over all periods. The investment in working capital

[illegible] remain constant or possibly increase in real terms. It was expected that

the liquidity for service firms would necessarily remain constant or possibly

[illegible] because the cash conversion cycle will not have an

increase in value [illegible] the expected that a positive

the average flow was positive, indicating the ratio

was the industry liquidity value for the same three years. Stated by the average

re liquidity ratios for the smaller firms.

Average Cash Flow

The [illegible] exhibit 3 indicate that the average liquidity values

for both small and medium sized companies generally increased over time. Specifically,

the average dollar index for large firms went from 1.705 in 1969 to a high of 6.796 in 1973 and ended in 1975 at 3.409--double the 1969 value. Similarly, the average dollar index for the small firms went from .05 in 1969 to about .10 in 1975. Notably, the relative measures for both samples were high during 1973 and 1974 which were periods of declining stock prices and generally low market liquidity as shown earlier. The relative measures for these two samples increased because the liquidity for both groups of firms likewise declined, but the decline was not as severe as for the aggregate market. Notably, the relative performance by the larger firms during this period of declining stock prices was superior to the performance by smaller firms.

Ratio Over Time

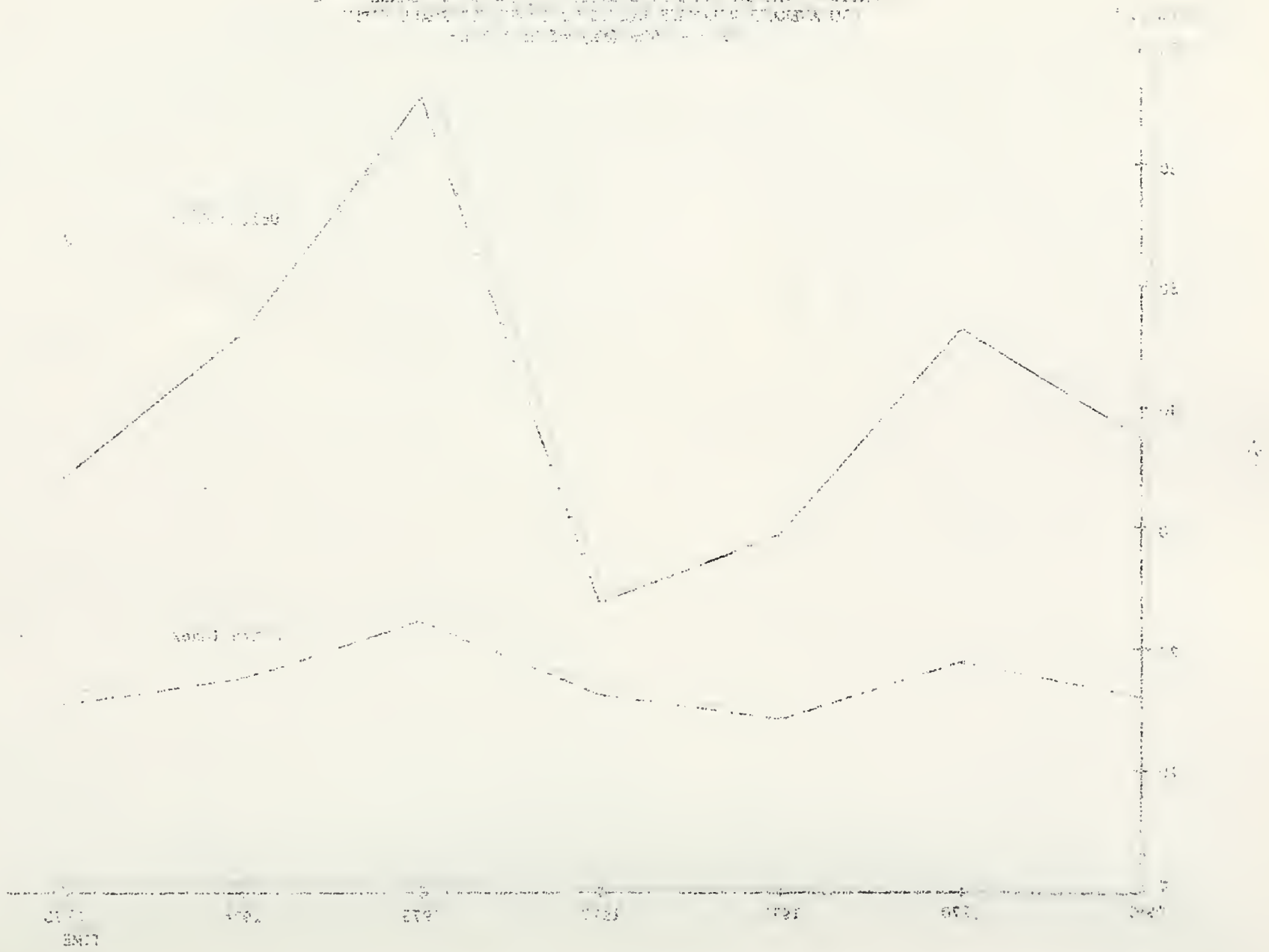
The performance of the large to small liquidity ratio over time was not consistent with expectations based upon the development of a tiered market. The time series plot shown in Exhibit 6 indicates that the ratio of the average relative liquidity measures varied over time and ended the period slightly lower than at the beginning of the period. Notably, this ratio declined during 1971 and 1972, and increased during 1973 and 1974. This would indicate that the differential between large and smaller firms varied by market period. Specifically, during rising markets such as 1971 and 1972 the relative liquidity for the smaller firms increased more than for the larger firms. In contrast, during declining markets, the market liquidity for smaller firms declines much more than that for larger firms.

Although the average relative liquidity data do not support the

Although the average relative liquidity data do not support the

EXHIBIT 6

RATIO OF AVERAGE RELATIVE LIQUIDITY INDEX FOR LARGE FIRMS
TO AVERAGE RELATIVE LIQUIDITY INDEX FOR SMALL FIRMS
1969 - 1975 (May of Each Year)



expectations, a more detailed analysis of the results for the individual firms provides some support for the hypothesis. Referring to Exhibits 3 and 4, one can determine what happened to individual firms over time, i.e., how many of the firms experienced changes? An analysis of only the first and last years (1969 and 1975) indicates that within the large firm sample (Exhibit 3) 15 of the firms clearly experienced increases in both measures of liquidity; only 3 experienced definite declines, and 6 had mixed results where one liquidity measure increased and the other declined. In contrast to these consistent increases within the large firm sample, the individual results for the smaller firm sample (Exhibit 4) indicated that only 8 firms experienced clear increases, 9 experienced definite declines, and 7 had mixed results. Notably four of the smaller companies that experienced increases had very large increases. Clearly, the results within the smaller firm sample are not as consistent as the results for the larger firms.

In summary, an analysis of the relative market liquidity for a sample of large firms and small firms indicates a wide difference in the level of liquidity--the average large firm had about 30 times more market liquidity than the average small firm on the basis of the dollar liquidity index. An analysis of changes in liquidity over time indicated that both samples of stocks experienced increases in liquidity for the overall period. In fact, the ratio of liquidity for the large versus the small indicated that the small firms increased slightly more from the first year to the last year. These results were inconsistent with expectations. Two points are worthy of note. First, the ratio of liquidity measures declined during rising markets and increased sharply during declining markets. This

indicates that the small firms gain in terms of relative liquidity during good markets, but suffer declines in relative liquidity during declining markets. Second, the individual firm results differed. The individual results for the large firms indicated that almost all of the large firms experienced an increase from 1969 to 1975. In contrast, only one-third of the small firms experienced an increase--apparently the average results for the smaller firm sample were carried by several very large increases.

CONCLUSIONS

The ability to buy or sell stock quickly without major price changes is obviously of importance to portfolio managers and investors because of its effect on the variability of returns. It is also of importance to corporate managers because it affects the company's ability to acquire new external equity capital and can influence the required return on the firm's equity.

The results reported here indicate several generalizations:

1) Aggregate market liquidity is very volatile over time.
2) The market liquidity for individual securities differs depending upon whether it is measured as dollar liquidity or share liquidity, but the two measures move in parallel over time.
3) The liquidity measures for individual securities vary substantially over time--even when adjusted for changes in market liquidity (i.e., relative liquidity varies).
4) There is a substantial difference in the level of liquidity for a sample of larger firms compared to a sample of smaller firms.
5) Apparently the liquidity for both samples has increased over time,

but the larger company results are more consistent and the larger firms tend to gain during declining markets when market liquidity is of greatest importance.

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